



Combating Public Health Infodemics: Strategies for Misinformation Control and Evidence-based Communication

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

This manuscript addresses the critical need to combat the public health infodemic, which can potentially undermine health interventions through the spread of misinformation and disinformation. It focuses on key areas where misinformation is most prevalent and proposes evidence-based strategies to counteract these threats. The manuscript outlines a multifaceted approach, including media literacy education, enhanced public communication strategies, and policy recommendations to promote accurate, reliable health information. By providing these solutions, this work aims to enhance public trust and improve the effectiveness of health communication efforts.

Keywords: Infodemic; misinformation; disinformation; media-bias; misleading.

1. INTRODUCTION

The recent explosion of publicly shared, decentralized information production in digital

societies especially through social media offers a historic opportunity for observing and analyzing complex social dynamics. It is also a highly valued instrument for studying, testing, and

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checking eventual solutions to crises of greater magnitude [1]. The spread of poor-quality, misleading, or manipulative information could surreptitiously exploit very basic but powerful human psychological mechanisms. Among these mechanisms are anxiety operationalized through denial or minimization of the threat, management of fear and anger through scapegoating responsible persons for the crisis, and provision of 'miracle' solutions to re-establish a sense of illusory control. Just like epidemics, infodemics are outbreaks of false rumors and unreliable news that suddenly affect the social dynamics and hence increase epidemic spreading. Infodemics demand careful policy interventions informed by state-of-the-art social and behavioral science research [2].

The term "infodemic" is derived from the roots "information" and "epidemic." It describes the rapid, very extensive spread of information that is correct and incorrect using mainly digital and social media. The concept found its place in the public eye when it was inaugurated during the COVID-19 pandemic [3]. The premier quickly became contagious to other avenues of public health. According to recent studies, findings indicate that fake news travels faster than facts for the most part on social media platforms (SMPs), despite their potential for health education. The heightened octane debate on whether the pandemic was man-made or natural did not help in the curbing of the condition and espousing preventive measures globally. Even after governments and health institutions broadcasted the vaccines, there was a significant number of masses who were skeptical about the protocols

An infodemic may aggravate a health crisis by spreading misinformation about diseases, treatments, and preventive measures; it confuses and shows a great deal of mistrust among people. To understand better, disinformation involves the deliberate creation and spread of false information to deceive, while misinformation is the sharing of false information without the intent to deceive. Both disinformation and misinformation can contribute to the spread of false information and have the potential to mislead and harm the public. Although the main difference is intent, both share the same characteristic of being distributed on SMPs [3]. Presumably, this idea has at the moment grown into the unanimous view that excessive news use—reliable or unreliable alike—has to be approached using epidemiological principles to

understand how online activities feed diffusion [4].

This has resulted in widespread misinformation in all aspects of pandemics, including prevention, treatment, risk factors, transmission mode, complications, and vaccines [3]. A racket of conspiracy theories prevails, more so about vaccines. Compared to other epidemics, a bulk of misinformation has mostly often been reported about Ebola. In the amplified infodemic, women, young respondents, and low-information respondents were more likely to interpret and disseminate the fabricated misinformation. A general lack of scientific knowledge and a general loss of faith in the government, increase the consumption of misinformation which is given the name and flesh quickly by the uncontrolled media, particularly social media [4].

Information spread through different communication networks is quite dynamic and vaguely understood given how it gets to reach a varied population of individuals who have the options of choosing between different assimilation options. Such understanding encompasses a relation to the behavior and social connections of different individuals with factors that inflict popularity in given content like time memory users, encapsulation, and the whole network structure [1]. However, the exact manner in which the diffusion of misinformation and provocative posts occurs during political events eludes clarification. That might be because a challenge of this nature at the population level could occur due to the complexity involved in teasing apart the dynamics of various interacting influences from social reinforcement.

Unless deliberate measures of countering the problem are taken, misinformation is likely to irrevocably damage public health by the dint of its antics in touting anti-science sentiment, general skepticism toward expertise, and eroding faith in media and democracy [5]. In connection with vaccination, in case people believe that the condition is serious, they are susceptible, and they perceive benefits from the vaccine, they would be more likely to intend to get vaccinated. On the other hand, lower intentions to vaccinate are underpinned by lower perceptions of susceptibility and vaccine benefits. While fact-checking and information literacy are the usual ways through which misinformation is handled, some warn that the effects of misinformation can persist even once it has been corrected. This is

because misinformation can be more convincing than facts if they provide a better explanation for an event. Health messages on social media have to be uncomplicated in their language and concepts, appeal to the audience on an emotional level, and be stimulating in the form of personal stories. The public has been updated with health information and is aware of diseases through platforms like Instagram and Facebook. However, the level of access to the internet among people living in developing countries remains low, hence their contribution and access to updated scientific information remains limited [3].

2. EDUCATING THE PUBLIC ON CRITICAL EVALUATION OF INFORMATION SOURCES TO REDUCE MISINFORMATION

In the current digital age, there is a proliferation of information across media that makes misinformation very fast-acting [6]. Public education regarding how to critically evaluate sources of information remains one of the key ground strategies for containing misinformation. This literature review provides an overview of the methods used in public education on critical information evaluation, challenges associated with it, and its effectiveness. Misinformation is spread through the use of false news, rumors, hoaxes, and many conspiracy theories. More often than not, it thrives pretty easily in social media platforms where every share is instant and reaches enormous audiences at any given time [7]. Algorithms driving such social media platforms look to prioritize measures of engagement, hence amplifying sensational or misleading posts.

Critical evaluation skills let individuals differentiate credible sources of information from those that are not credible. Some of the skills which can be put into practice include the trustworthiness of the source, qualification of the author, reputation of the publication, whether there is mention of citations or references, among others. Information verification involves checking it against previously existing and credible sources of information [6]. This step is very important in ensuring that the accuracy of the information, which is central to making informed decisions, earning credibility, and avoiding misinformation, is guaranteed. Bias recognition: That is, there are the possible biases that are a product of the author's views, funding sources, or publication editorial stance and

logical analysis, during the review of coherence and logical consistency of arguments.

National health examination surveys have been developed to collect important information which cannot be obtained through other sources. The health examination survey provides more accurate information than the health interview survey. However, most low and middle income countries report to have at least one small health examination survey implemented under the WHO STEPwise approach to noncommunicable disease risk factor surveillance, known as STEPS 5. In addition, most low and middle income countries conduct Demographic and Health Surveys, sponsored by the United States Agency for International Development, at a minimum of once every 5 years; some, like Peru, do it annually [8]. Such activities engage the public and provide education on source evaluation, thereby reducing misinformation.

One key mechanism to reduce the spread of misinformation is greater digital literacy, which can be acquired through continuous education of the public on how to critically evaluate sources of information. If one equips people with the ability to separate credible sources from non-credible ones, then they will have effectively created a resilient society [9]. Although not without its challenges, through continued efforts at education, responsive in nature, alongside collaboration between parties and research, this would greatly decrease the impacts of misinformation on public discourse and decision-making. The dissemination of misinformation can be averted, and decisions are sure to be based on facts if information is checked against trustworthy sources. If one has done something in a systematic way, identified trustworthy sources, and has an element of critical thinking, they shall be well on their way to separating the chaff from the wheat.

3. PROMOTING ACCURATE INFORMATION AND COUNTERING MISINFORMATION THROUGH ACCESSIBLE AND ENGAGING COMMUNICATION STRATEGIES

This rests with health authorities and professionals to protect public health through the dissemination of information in an accurate and far-reaching manner [6]. In this respect, strategies that assure easy reach, access, and engagement with target audiences have to be considered and implemented by health

authorities in order to counteract the far-reaching effects of misinformation. This shall include communication strategies targeted at reaching audiences with diverse health literacy levels, language, and cultural backgrounds. Plain language, clearly, can make the health message more understandable and relatable to the general public; therefore, it would reduce confusion and mistrust [9]. This includes making the communication clear and using infographics or videos with interactive content that a person can go through easily in order to understand the information better.

Social media has been an effective tool in the fight against misinformation. With its huge reach and ability to engage users directly, it's able to achieve what many other forms of communication were unable to. Health authorities should leverage these platforms to share accurate information in a timely manner and interact with their audience in real-time. Shareable content is designed to engage users through compelling narratives, testimonials, and myth-busting facts that will counteract misinformation. Influencers within a community, and other persons of greater than average credibility, may also be engaged to disseminate accurate health messages, as they often wield huge influence over public opinion and behavior [10].

More than this, health authorities have to project transparent and consistent visibility across communication channels for the purpose of establishment and retention of public trust. Regular updates, openness in the flow of information, and responsiveness to public queries can bring about an element of reliability and credibility [5]. This assumes special significance when pandemics are raging and misinformation through social media can go viral, leading to the most unfortunate consequences. By being a reliable source of correct information, health authorities can neutralize the impact of such misinformation and set the populace on the road toward well-informed decisions.

Such collaboration with traditional media remains a critical part of a health communication campaign [3]. Supplying journalists with accurate, timely, and clear information can increase the likelihood that news stories will be reported as fact and not sensationalized. It is possible to assist in the appropriate reporting of health stories by holding press briefings, issuing press releases, and making expert spokespeople

available for interviews. Moreover, health literacy training for journalists and the identification of credible sources will further improve the quality of information going out to the public. In conclusion, it is very important to monitor continuously the communication strategies and know the actual impact of different approaches. This will yield very useful insights into what works best in different contexts by tracking the flow of misinformation and measuring the actual impact of various approaches. Public feedback and interdisciplinary expertise from communication, technology, and behavioral science will help in making continuous modifications and improvements in communication strategies. If health authorities remain nimble and responsive to how the information dissemination terrain continues to shift, they will do a better job of protecting public health against the harms of misinformation [9].

Health authorities and professionals could play a very useful role in supporting accurate information and refuting misinformation. Active communication approaches can deal with the challenges posed by health-related misinformation. Strategies include collaboration with media and technology platforms and engaging with the public through education and transparency in their pursuits. This requires continuous effort, adaptive strategy, and global cooperation in order to ensure public health and safety against emerging threats of misinformation.

4. THE COLLABORATION BETWEEN SOCIAL MEDIA, TECHNOLOGY COMPANIES, AND HEALTH AUTHORITIES IN COMBATING MISINFORMATION

In the present-day life, companies in social media and technology have turned out to be part and parcel of the day-to-day lives in our present times [3]. They allow global communication, information sharing, and social interaction. However, they also pose many challenges, most notably in misinformation. Misinformation travels fast through social media, harming public health, safety, and people's trust in institutions. Misinformation refers to false or misleading information, irrespective of the intention behind its dissemination. Misinformation in the field of public health can result in dire consequences [3]. For instance, in the present COVID-19 pandemic, misinformation on the virus, vaccines, and treatment approaches disseminated through

online sources has resulted in public confusion and low confidence in health authorities, harboring behavioral consequences.

The onus on sharing information is on social media and tech companies like Facebook, Twitter, Google, and YouTube. Algorithms of such platforms bring outlines of contents of an emotive nature through user engagements that sometimes unintentionally lead to sensationalism and misinformation [11]. It is incumbent on these companies to clean their plate and not facilitate misinformation that might do damage during public health crises. This may involve periodic algorithmic changes that favour more authoritative sources, or flag and suppress visibility on content of concern; partnering with independent fact-checking organizations to review and validate content; equipping users with the necessary tools and resources to aid them in the identification and reporting of potential misinformation; content moderation through the implementation of artificial intelligence and human moderators for the identification and removal of damaging misinformation, among other measures [2].

Health authorities are the institutions with the expert judgment and credibility necessary for them to adequately inform the public on health issues. A collaboration with this kind of authorities will ensure right information shares and misinformation effectively put at bay. For example, health authorities should establish avenues for direct live interactions with the social media organization to respond rapidly to the emergence of new forms of misinformation. They must also be capable of designing campaigns on issues of public awareness that can use the vast reach of social media to be disseminated to as many members of the public as possible from credible health information - or even come up with an open policy on misinformation and make routine reports on the efforts being made in fighting it [10].

Several case studies underscore the potency of these types of partnerships, such as when platforms like Facebook and YouTube worked with the World Health Organization to pull down false claims about the virus and vaccines and boost content from credible health sources. In cases in Africa during measles outbreaks, social media platforms have partnered with health authorities in removing anti-vaccine-related content and boosting vaccination information. Working together becomes part of the solution

for social media, technology companies, and health authorities in fighting the spread of misinformation. Drawing from individual strengths and resources, such like-minded collaboration can make sure that information shared is accurate, safeguarding health and maintaining the much-needed trust of the citizens. As the digital environment continues to grow and expand, many efforts and adaptations become mandatory towards a bigger challenge of misinformation [12].

5. FOSTERING PUBLIC TRUST THROUGH TRANSPARENT COMMUNICATION BY HEALTH AUTHORITIES

In public health, the communication strategies that health authorities use become very instrumental in the formation of public perception, behavior, and trust. The basis for any effective health communication has to be transparency [13]. It makes sure that people get clear, accurate, and timely information, which forms a good base for building and retaining trust between health authorities and the communities they serve. Transparency in public health communication is rated based on how openly, clearly, and honestly such information is relayed or shared [14]. This would involve the capability to provide full disclosure of information on health hazards, interventions, policies, and the justification for reaching certain decisions. In this respect, when a health authority communicates transparently with the public, it empowers people with the capacity for informed decision-making in very crucial moments of health crises—a pandemic or outbreak of infectious diseases.

Trust is an important ingredient in the relationship between health authorities and the public. It's built over time through the sharing of information in a timely, transparent, and honest way [9]. Transparent communication will first allow clarity in the communication so that the public understands what is communicated in terms of health messages. The understanding of these messages is key to adhering to health guidelines and recommendations. Secondly, it provides accurate information that dispels any myths or misinformation, which may be very rampant during health crises. Accurate information builds trust and credibility in health authorities [12]. It is important to keep the general public updated, promptly, on any emerging situation regarding health. Delayed communication may fuel confusion, panic, and

finally loss of trust. Moreover, transparent communication and accountability are meant to enhance faith in health authorities. They prove to be responsible and answerable to the public [14].

Health examination surveys offer an irreplaceable contribution to the local availability of primary health data that can be used in a range of further studies, like burden-of-disease, cost, and policy impact studies. These, in particular, are important contributions in informing many phases of the health planning cycle, from surveillance to resource mobilization and policy development. There are some good reasons why sources led by health providers cannot replace health examination surveys: they tend to underestimate morbidity and are open to several types of bias. Moreover, nationally representative samples of the general population need to be harnessed if external validity is to be retained for any survey. It can also provide assurance to the external quality control of a country's health system and transparency in the use of expenditure by the health authority. Fieldwork of health examination surveys will probably be improved by incorporating technological innovation in the future. Such events assist in fostering public trust through transparent communication by Health Authorities. It is necessary to develop globally-minded efforts that will help low-income countries develop the health examination surveys needed to guide policy development, implementation, and assessment [8].

It is through transparent communication that health authorities can be able to establish and maintain public trust. Through transparent communication, health authorities may guide the public to navigate health crises and get compliance with health guidelines so as to protect public health. It is not a moral and ethical commitment but a strategy for efficiently managing public health.

6. FACT-CHECKING AND CORRECTION TOWARDS ALLEVIATING INFODEMIC IN PUBLIC HEALTH

An infodemic is now regarded as a development that has been stated to be dangerous to public health efforts, mainly due to eroded trust in health institutions. One of the major issues associated with infodemic is the dissemination of false information that can lead to harmful behaviors [6]. As such, fact-checking and correction are very important mitigation

strategies against an infodemic. The fact-checking process in public health matters assists in ensuring that correct and credible information is given out, which may have a positive effect on the health of a community and individual behaviors.

Basically, fact-checking means comparing the information with objective facts. Fact-checking in public health identifies or debunks false claims; if fact-checkers are ahead, then it will stop the spread of misinformation, which may harm public health efforts. In return, fact-checking organizations can help the public understand how to identify trustworthy sources of information and verify information for themselves [13]. This would engender a more aware and vigilant audience. At the last end, transparent and robust fact-checking will contribute to enhancing trust in institutions of public health by demonstrating a commitment to accuracy and truthfulness.

The COVID-19 pandemic was the high point in fact-checking history. Organizations like the WHO and fact-checking sites such as Snopes and FactCheck.org made a great deal of effort to debunk myths related to viruses, vaccines, and treatments. International collaborative efforts like the International Fact-Checking Network brought together fact-checkers worldwide against an infodemic [14]. Another case study is that the misinformation about vaccines has endured. Efforts in checking for facts have focused on correcting false claims regarding the safety and effectiveness of vaccines. Studies have shown that such targeted correction campaigns do increase acceptance of vaccines.

This is the reason why future efforts have to be based on developing and using artificial intelligence and machine learning for the identification of misinformation, correcting it more efficiently, and subsequently spreading the correct information; strengthening international and cross-sector collaborations by sharing resources and best practices; investing in public education campaigns that enhance health literacy and critical thinking capacity among people at large; and advocacy for policy reforms that will create transparency and accountability in information dissemination [15].

Fact-checking and correction are key mechanisms in the fight against the infodemic in public health. Fact-checkers try to correct the negative impact of misinformation on public health goals by providing accurate, timely, and

accessible information. In order to have maximum effect in making a society much more informed and resilient, innovation, collaboration, and public engagement must be continuous. Through rigorous fact-checking of public health information, individuals and communities can make choices that support better health and well-being [11].

7. CONCLUSION

The Infodemic is a global health security threat because health emergencies arise and conclude in communities, which amplifies misinformation and further complicates the response to health crises. The distribution and success of false information relies on emotional stories over facts and figures which make them more appealing to the public. Whilst freedom of speech is of paramount importance SMP providers have a responsibility to ensure that information is accurate and does not lead to dangerous and unsafe behaviour. There are also different motivating factors that need to be considered. The main point of communicating facts based on medical research is to enhance the global understanding of health issues, and to find optimal ways of managing them. The spread of false information among the masses is not a new phenomenon. In recent years, the spread of inaccurate information has played a significant role in propagation of false narratives surrounding health issues. Infodemics demand careful policy interventions informed by state-of-the-art social and behavioral science research. It is the civic responsibility and very concept of institutional sources to fact-checking and certification to ebb away media bias that is today still largely Western-centric. The approaches are very critical in taking a step backwards to proactive, solution-oriented endeavors of deconstructing misinformation at varied levels and how each comes about. Society will be quite well positioned in the complexities of information during this digital age toward the protection of public health if it comes from a standpoint of understanding its formation and effects, coupled with the implementation of comprehensive strategies in taming the same.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

CONSENT

It is not applicable.

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DATA AVAILABILITY STATEMENT

The data supporting this study's findings are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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